



# Spectral Gamma-Ray Borehole Log Data Report

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Borehole

# 30-00-11

Log Event A

## Borehole Information

|                         |                                 |                                  |
|-------------------------|---------------------------------|----------------------------------|
| Farm : <u>C</u>         | Tank : <u>C</u>                 | Site Number : <u>299-E27-121</u> |
| N-Coord : <u>42,840</u> | W-Coord : <u>48,780</u>         | TOC Elevation : <u>Unknown</u>   |
| Water Level, ft :       | Date Drilled : <u>3/31/1977</u> |                                  |

## Casing Record

|                            |                               |                    |
|----------------------------|-------------------------------|--------------------|
| Type : <u>Steel-welded</u> | Thickness : <u>0.280</u>      | ID, in. : <u>6</u> |
| Top Depth, ft. : <u>0</u>  | Bottom Depth, ft. : <u>60</u> |                    |

Cement Bottom, ft. : 60      Cement Top, ft. : 0

## Borehole Notes:

Borehole 30-00-11 was drilled in March 1977 to a depth of 60 ft with 6-in. casing. The casing thickness is presumed to be 0.280 in., on the basis of the published thickness for schedule-40, 6-in. steel tubing. No driller's log is available for this borehole so construction details from Chamness and Merz (1993) were used in preparing this report. Chamness and Merz (1993) note that the borehole casing was grouted, but give no details as to which interval(s) were grouted or how much grout was used. No mention is made of perforations and it is therefore assumed that the borehole casing was not perforated.

The top of this borehole is against an approximately 10-ft by 30-ft cover block. The top of the casing, which is the zero reference for the SGLS, is even with the ground surface. The total logging depth achieved by the SGLS was 58.5 ft.

## Equipment Information

|                                   |   |  |
|-----------------------------------|---|--|
| Logging System : <u>2</u>         | Detector Type : <u>HPGe</u>               | Detector Efficiency: <u>35.0 %</u>     |
| Calibration Date : <u>10/1996</u> | Calibration Reference : <u>GJO-HAN-13</u> | Logging Procedure : <u>P-GJPO-1783</u> |

## Log Run Information

|                                 |                                  |                                    |
|---------------------------------|----------------------------------|------------------------------------|
| Log Run Number : <u>1</u>       | Log Run Date : <u>04/17/1997</u> | Logging Engineer: <u>Bob Spatz</u> |
| Start Depth, ft.: <u>0.0</u>    | Counting Time, sec.: <u>100</u>  | L/R : <u>L</u> Shield : <u>N</u>   |
| Finish Depth, ft. : <u>13.0</u> | MSA Interval, ft. : <u>0.5</u>   | Log Speed, ft/min.: <u>n/a</u>     |
| Log Run Number : <u>2</u>       | Log Run Date : <u>04/18/1997</u> | Logging Engineer: <u>Bob Spatz</u> |
| Start Depth, ft.: <u>58.5</u>   | Counting Time, sec.: <u>100</u>  | L/R : <u>L</u> Shield : <u>N</u>   |
| Finish Depth, ft. : <u>12.0</u> | MSA Interval, ft. : <u>0.5</u>   | Log Speed, ft/min.: <u>n/a</u>     |



Borehole

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Log Event A

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## Analysis Information

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Analyst : D.L. Parker

Data Processing Reference : MAC-VZCP 1.7.9

Analysis Date : 10/21/1997

### Analysis Notes :

This borehole was logged by the SGLS in two log runs. The pre- and post-survey field verification spectra met the acceptance criteria established for the peak shape and detector efficiency, confirming that the SGLS was operating within specifications. The energy calibration and peak-shape calibration from these spectra were used to establish the peak resolution and channel-to-energy parameters used in processing the spectra acquired during the logging operation. No fine gain adjustments were necessary during logging of this borehole.

Casing correction factors for a 0.280-in.-thick steel casing were applied during analysis.

The man-made radionuclide Cs-137 was detected around this borehole. The presence of Cs-137 was measured almost continuously from the ground surface to a depth of 17.5 ft. The Cs-137 concentrations from ground surface to about 11 ft are higher than the concentrations below 11 ft. A region of high Cs-137 concentrations occurs from about 8.5 to 11 ft and includes a maximum Cs-137 concentration of 2.9 pCi/g at 10.5 ft.

K-40 concentrations are somewhat variable from 1 to 22 ft. K-40 concentrations increase steadily from 1 to about 3.5 ft reaching a concentration of about 15.8 pCi/g, and then decrease to about 11 to 12 pCi/g from about 6 to 11 ft. K-40 concentrations increase steadily to a background of about 17 pCi/g.

It was not possible to identify many of the 609-keV peaks used to derive the U-238 concentrations between about 9.5 and 11 ft.

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Report for tank C-110.

### Log Plot Notes:

Separate log plots show the man-made and the naturally occurring radionuclides. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations. Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.

A plot of representative historical gross gamma-ray logs from 1977 to 1980 is included.